

START

0027590

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 196026

Proj.
ECN

2. ECN Category (mark one)

Supplemental ☐
Direct Revision ☒
Change ECN ☐
Temporary ☐
Standby ☐
Supersedure ☐
Cancel/Void ☐

3. Originator's Name, Organization, MSIN, and Telephone No.

J. M. AYRES/100 AREA RI/H6-02/6-3918

4. Date

04/13/93

5. Project Title/No./Work Order No.

DOWFORVadose Drillingn 100-FR-1, WHC-SD-EN-
AP-091, REV2, P711A

6. Bldg./Sys./Fac. No.

740 STEVENS

7. Impact Level

3Q

8. Document Numbers Changed by this ECN
(includes sheet no. and rev.)

WHC-SD-EN-AP-091, Rev 1

9. Related ECN No(s).

166768

10. Related PO No.

N/A

11a. Modification Work

☐ Yes (fill out Blk.
11b)☒ No (NA Blks. 11b,
11c, 11d)11b. Work Package
No.

NA

11c. Modification Work Complete

NA

Cog. Engineer Signature & Date

11d. Restored to Original Condi-
tion (Temp. or Standby ECN only)

NA

Cog. Engineer Signature & Date

12. Description of Change

Document revised to reflect necessary technical/editorial changes.

13a. Justification
(mark one)Criteria Change ☐Design Improvement ☐Environmental ☒As-Found ☒Facilitate Const. ☐Const. Error/Omission ☐Design Error/Omission ☒

13b. Justification Details

Changes necessary to clarify field procedures.

14. Distribution (include name, MSIN, and no. of copies)

JM AYRES H6-02
RP HENCKEL H6-02
GS CORRIGAN H4-16
CENTRAL FILES (2) L8-04
EDMC (2) H6-08

RELEASE STAMP

OFFICIAL RELEASE **11**
BY WHC

DATE APR 14 1993

Station #12

ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

196026

15. Design Verification Required

☐ Yes
☒ No

16. Cost Impact

ENGINEERING

NA

Additional

☐

\$

CONSTRUCTION

Additional

☐

\$

Savings

☐

\$

Savings

☐

\$

17. Schedule Impact (days)

NA

Improvement

☐

Delay

☐

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision

Document Number/Revision

Document Number/Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer J.M. AYRES	4/14/93	PE	
Cog. Mgr. R.P. HENCKEL	4-14-93	QA	
QA G.S. CORRIGAN	4-14-93	Safety	
Safety		Design	
Security		Environ.	
Environ.		Other	
Projects/Programs			
Tank Waste Remediation System			
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other			

SUPPORTING DOCUMENT		1. Total Pages 18
2. Title Description of Work for Vadose Drilling in the 100-FR-1 Operable Unit		3. Number WHC-SD-EN-AP-091
		4. Rev No. 2
5. Key Words borehole, excavation, test pits, analytical sampling, geophysical		6. Author Name: J. M. Ayres Signature <i>JM Ayres</i> 4/14/93 Organization/Charge Code 81310/P711A
7. Abstract Ayres, J. M., 1983, <i>Description of Work for Vadose Drilling in the 100-FR-1 Operable Unit</i> , WHC-SD-EN-AP-091, Rev. 2, Westinghouse Hanford Company, Richland, Washington.		
<p>8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.</p> <p>PATENT STATUS - This document copy, since it was transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval or such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.</p> <p>DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.</p>		<p>10. RELEASE STAMP</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>OFFICIAL RELEASE (11)</p> <p>BY WHC</p> <p>DATE APR 14 1993</p> <p><i>Station #12</i></p> </div>
9. Impact Level 3Q		

RECORD OF REVISION

(1) Document Number

WHC-SD-EN-AP-091,
REV 2

Page 1

(2) Title

Description of Work for Vadose Drilling in the 100-FR-1 Operable Unit

CHANGE CONTROL RECORD

[illegible]

CONTENTS

1.0	SCOPE OF WORK	1
2.0	GENERAL REQUIREMENTS	1
2.1	HEALTH AND SAFETY	1
2.2	PREREQUISITES	1
3.0	SAMPLING AND FIELD ACTIVITIES	6
3.1	SOIL SCREENING	6
3.1.1	Borehole	6
3.1.2	Test Pit	8
3.2	BOREHOLE GEOLOGIC SAMPLING	8
3.3	ANALYTICAL SAMPLING	8
3.3.1	BOREHOLE	9
3.3.2	TEST PIT	9
3.4	SOIL SAMPLING (PHYSICAL PROPERTY)	10
3.5	GEOPHYSICAL LOGGING	11
4.0	ANALYSES	12
5.0	QA/QC REQUIREMENTS	12
6.0	SCHEDULE	14
7.0	CHANGES TO DESCRIPTION OF WORK	14
8.0	REFERENCES	14

FIGURES

1	Location of Test Pits 116-F-1B and 116-F-1C	2
2	Location of Borehole 116-F-1A	3
3	Location of Boreholes 116-F-3, 116-F-4, 116-F-6, and 108-F (Hand Sample)	4
4	Location of Boreholes 116-F-9C, 116-F-9D, 116-F-2, and 116-F-14	5
5	Location of Background Site	7

TABLES

1	Borehole Expected Waste Depths	9
2	Test Pit Expected Waste Depths	10
3	List of Analytes	13

1.0 SCOPE OF WORK

This description of work (DOW) details the field activities associated with cable-tool drilling of six vadose boreholes and backhoe excavation of four test pits in the 100-FR-1 Operable Unit (Task 5) and will serve as a field guide for those performing the work. It should be used in conjunction with the *Remedial Investigation/Feasibility Study Work Plan for the 100-FR-1 Operable Unit, Hanford Site, Richland, Washington* (DOE-RL 1992) for general investigation strategy and with *Environmental Investigations and Site Characterization Manual* (WHC 1988c) for specific procedures. Test pit and borehole locations are shown on Figures 1 through 4.

2.0 GENERAL REQUIREMENTS

2.1 HEALTH AND SAFETY

All personnel working to this DOW will have completed the 40-Hour Hazardous Waste Site Worker Training Program and will perform all work in accordance with the following:

- WHC-EP-0383, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan* (WHC 1990)
- WHC-CM-4-10, *Radiation Protection* (WHC 1988d)
- WHC-CM-4-11, *ALARA Program* (WHC 1988a)
- WHC-CM-4-3, *Industrial Safety Manual*, Vol. 1 through 3 (WHC 1987)
- WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1988b)
- WHC-CM-7-7, *Environmental Investigations and Site Characterization Manual* (WHC 1988c)
- WHC-SD-EN-SAD-002, Rev 0, *100 Area Low Hazard Characterization Activities Safety Assessment* (Taylor 1991)
- Site-specific health and safety plan/job safety analysis.

2.2 PREREQUISITES

The requirements and procedures applicable to the 100-FR-1 operable unit field activities are specified in the *Environmental Investigations and Site Characterization Manual* (WHC 1988c). The environmental investigation instructions (EII) that are applicable include:

- EII 1.1 Hazardous Waste Site Entrance Requirements
- EII 1.5 Field Logbooks
- EII 1.13 Readiness Review

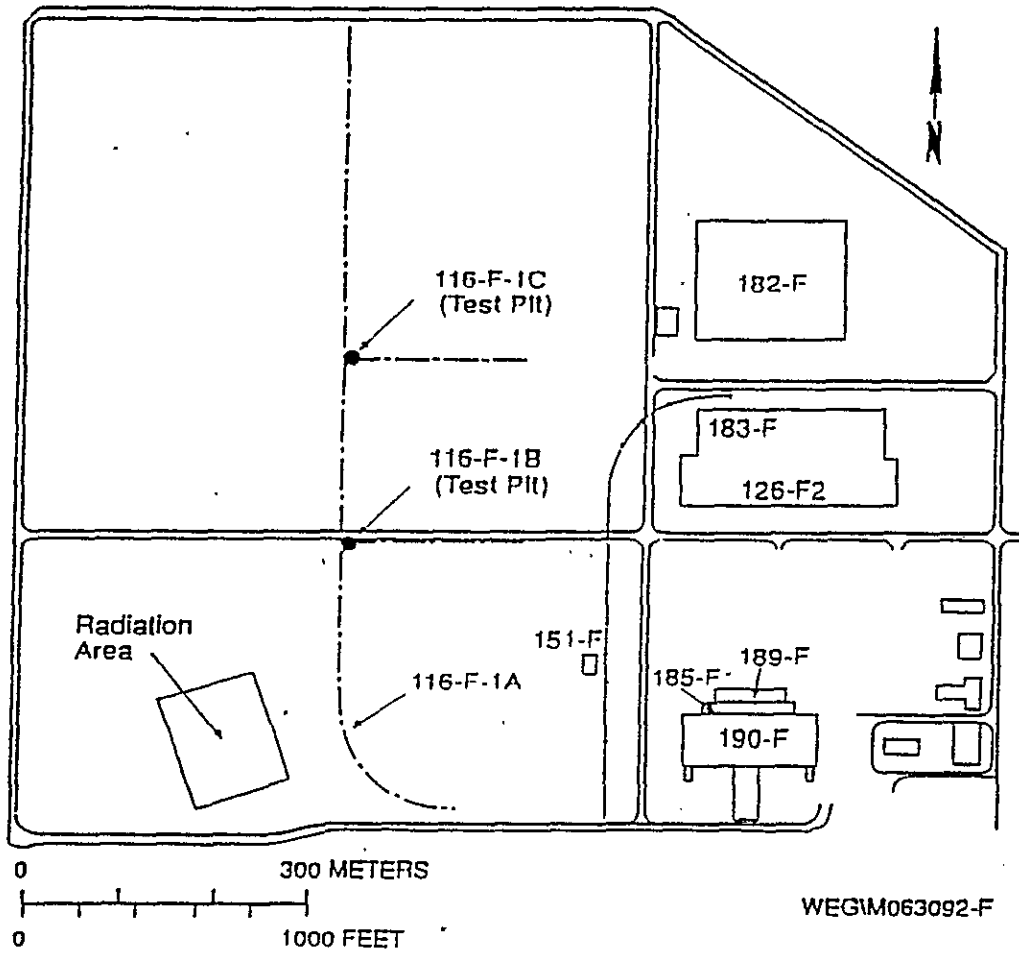


Figure 1. Location of Test Pits 116-F-1B and 116-F-1C.

9 3 1 2 9 0 5 1 2 3 9

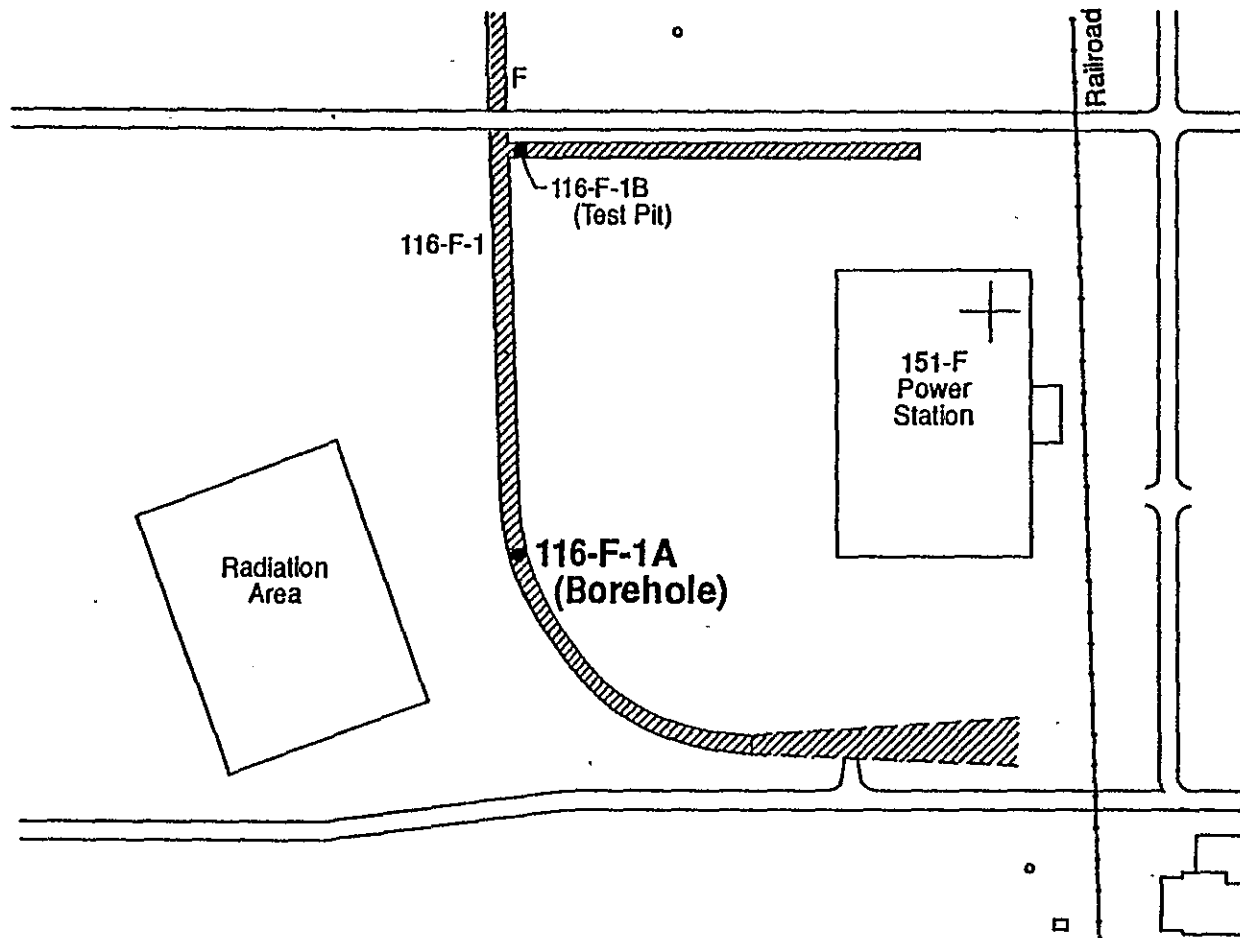
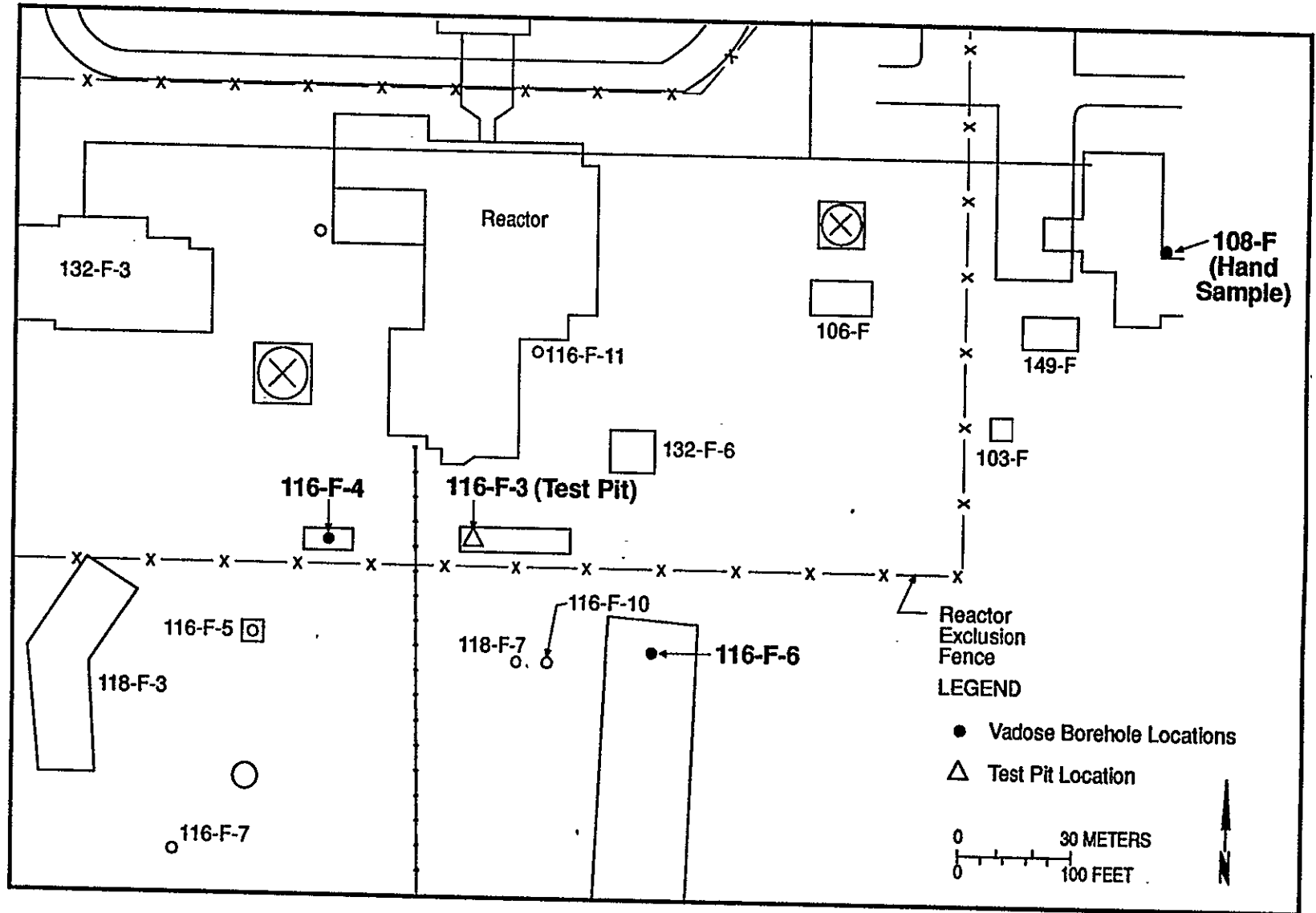
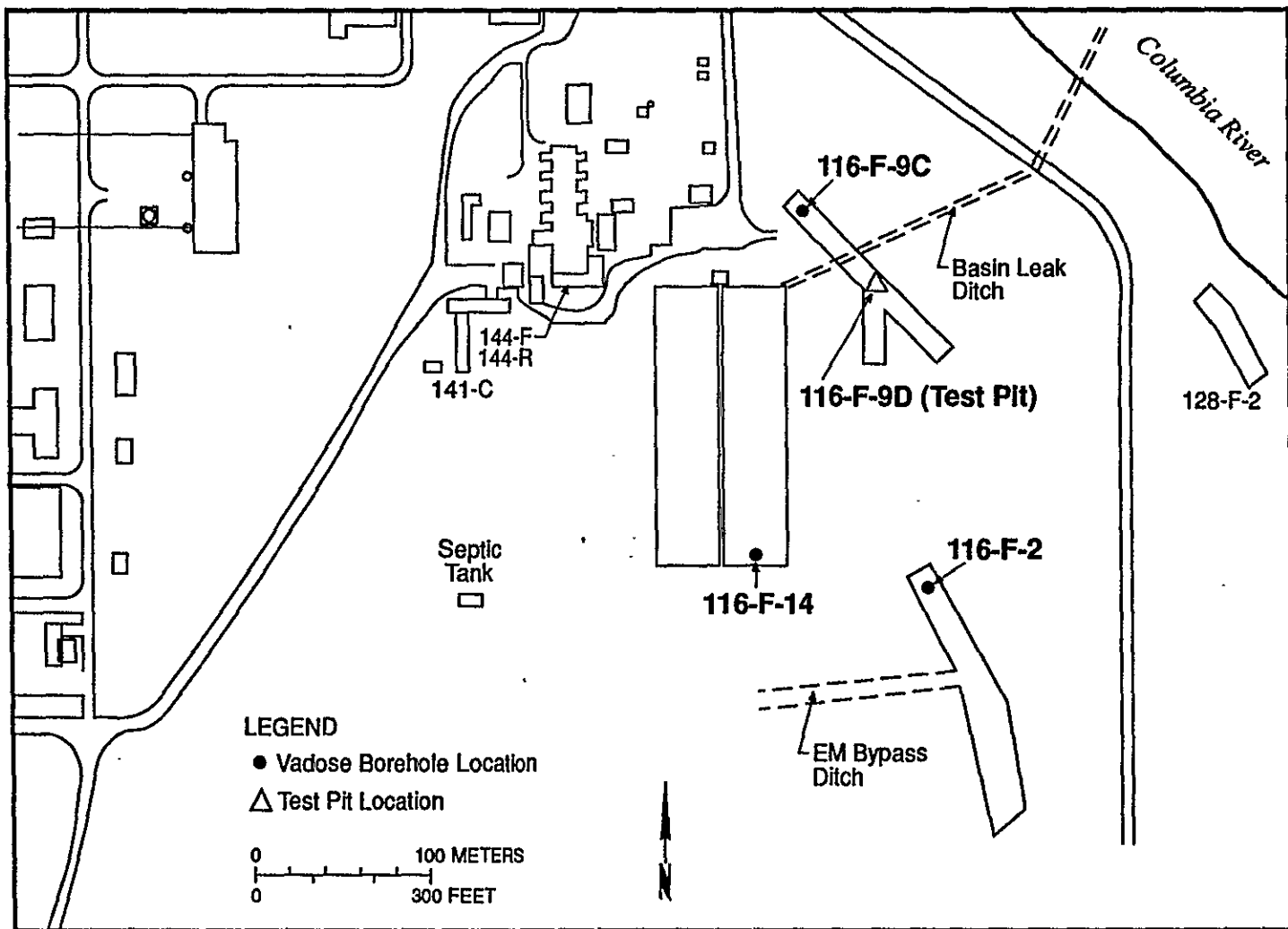


Figure 2. Location of Borehole 116-F-1A.

Figure 3. Location of Boreholes 116-F-3, 116-F-4, 116-F-6, and 108-F (Hand Sample).



JMAW123192-A



JMA/M123192-B

Figure 4. Location of Boreholes 116-F-9C, 116-F-9D, 116-F-2, and 116-F-14.

- EII 2.1 Preparation of Hazardous Waste Operations Permit
- EII 3.2 Health and Safety Monitoring Instruments
- EII 3.4 Field Screening
- EII 4.3 Control of CERCLA and Other Past-Practice Investigation
Derived Waste
- EII 5.1 Chain of Custody
- EII 5.2 Soil and Sediment Sampling
 - App. B Split-Spoon Sampling Method
 - App. E Surface Sampling Method
- EII 5.4 Field Decontamination of Drilling, Well Development, and
Sampling Equipment
- EII 5.7A Hanford Geotechnical Sample Library Control
- EII 5.10 Obtaining Sample Identification Numbers and Accessing HEIS
Data
- EII 5.11 Sample Packaging and Shipping
- EII 6.1 Activity Reports of Field Operations
- EII 6.7 Resource Protection Well and Test Borehole Drilling
 - App. A Drilling with a Cable-Tool Drill Rig
- EII 9.1 Geologic Logging
- EII 11.1 Geophysical Logging

Each item on the Drilling Planning Form (EII 6.7, Resource Protection Well and Test Borehole Drilling [WHC 1988c]) or the checklist for tasks requiring no readiness review (EII 1.13, Environmental Engineering and Geotechnology Readiness Review [WHC 1988c]) will be signed and dated by the cognizant engineer or field team leader prior to the start of work.

3.0 SAMPLING AND FIELD ACTIVITIES

3.1 SOIL SCREENING

3.1.1 Borehole

All samples and cuttings will be field screened for evidence of volatile organic compounds (VOC) and radionuclides. The VOC will be screened by the field geologist using an organic vapor monitor (OVM) that will be used, maintained, and calibrated consistent with EII 3.2, Health and Safety Monitoring Instruments, and EII 3.4, Field Screening, Appendix B, (WHC 1988c). Radionuclide screening will be performed by the field geologist per EII 3.4, Field Screening, Appendix A, (WHC 1988c). The field geologist will record screening results in the borehole log.

The action level from radionuclide screening is twice background and, for VOC screening, 5 ppm above background. Prior to initiating drilling, a one-time instrument background reading will be recorded using the OVM, and radionuclide detection instrument at the background site (Figure 5). Figure 5 does not address vadose hole locations. The OVM instrument background will be measured by taking readings at the work site by measuring ambient air for 1 minute. The field geologist will record the background levels in the borehole log prior to the start of drilling.

9 3 1 0 9 0 5 1 2 9 3

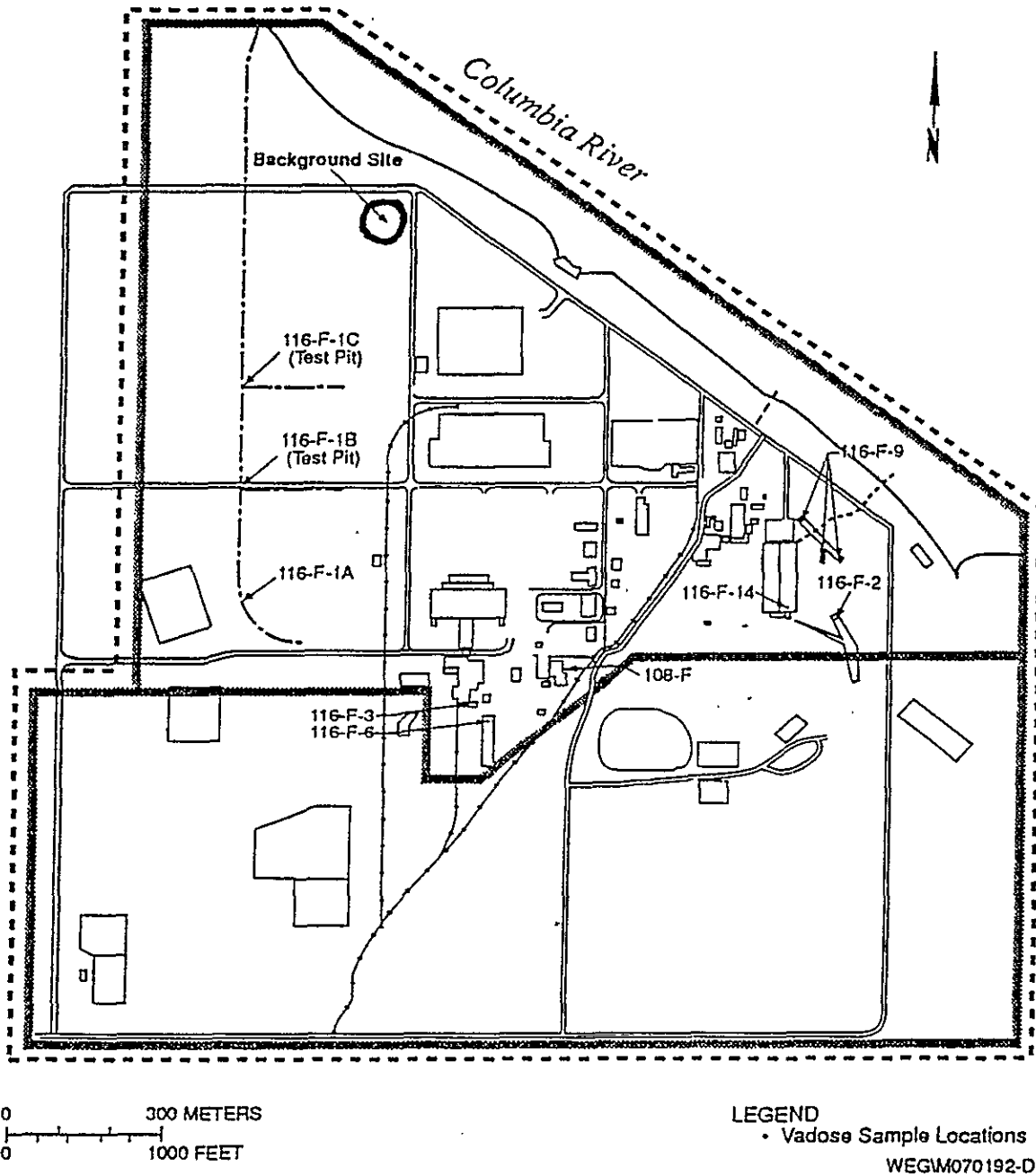


Figure 5. Location of Background Site.

Chromium screening will take place only on the last sample interval using a portable hexavalent chromium test kit per EII 3.4, Field Screening, Appendix C, (WHC 1988c). The field geologist will record the screening results in the borehole log. The Chromium screening is for general information, thus no action level is required.

Boreholes will be abandoned per EII 6.7, Resource Protection Well and Test Borehole Drilling (WHC 1988c).

3.1.2 Test Pit

All excavated material removed from the test pit will be field screened by the geologist, for evidence of VOC and radionuclides (DOE-RL 1991, Section 5.1.1.5.3). The VOC will be screened using an OVM that will be used, maintained, and calibrated consistent with EII 3.2, Health and Safety Monitoring Instruments, and EII 3.4, Characterization Instruments, Appendix B, (WHC 1988c). Radionuclides will be screened per EII 3.4, Appendix A. Field screening results will be recorded in the field logbook.

All excavated material removed from the test pit will be field screened for evidence of VOC and radionuclides. The VOC will be screened using an OVM that is used, maintained, and calibrated consistent with EII 3.2, Calibration and Control of Monitoring Instruments. Radionuclides will be screened and documented by the onsite Health Physics Technician. Chromium screening will take place only on the last sample interval using a portable hexavalent chrome test kit. There will be two chromium screenings at different locations within the last sampling interval. All screening results will be entered in the field logbook.

3.2 BOREHOLE GEOLOGIC SAMPLING

Geologic samples will be taken at 5-ft intervals and at major stratigraphic changes for the preparation of borehole logs (DOE-RL 1992, Section 5.1.1.5.2) and EII 9.1, Geologic Logging (WHC 1988c). The field geologist shall archive the nonradioactive geologic samples per EII 5.7A, Hanford Geotechnical Sample Library Control (WHC 1988c).

All waste generated as a result of the vadose investigation activities will be handled according to EII 4.3, Control of CERCLA and Other Past-Practice Investigation Derived Waste.

3.3 ANALYTICAL SAMPLING

One analytical sample will be taken of the surface soil at each borehole or test pit location prior to commencement of drilling or excavating. These surface samples will be collected per EII 5.2, Soil and Sediment Sampling (WHC 1988c) and analyzed per Section 4.0 of this DOW. Test pit 116-F-1C will

be sampled to the water table regardless of screening. All other analytical sampling will be based on the following:

1. If drill cuttings or exposed material in the backhoe bucket fail (are greater than or equal to) the screening criteria, collect and analyze samples at that point and continue sampling at 5-ft intervals until two consecutive clean samples below the expected (observed) waste depth pass the screening criteria. Maximum sampling depth will be 5 ft below the water table (Table 1).
2. If drill cuttings or exposed material in the backhoe bucket pass (are less than) the screening criteria. Continue screening up to the expected waste depth. Collect and analyze one sample from the expected (observed) waste depth and continue sampling at 5-ft intervals until two consecutive samples pass the screening requirements. If any cuttings or exposed material fail the screening criteria, then proceed as in item 1 above. Maximum sampling depth will be 5 ft below the water table.

Table 1. Borehole Expected Waste Depths.

Borehole	Expected waste depth (ft)	Depth to ground-water (ft) ^b
116-F-1A	10 ^a	13
116-F-2	20 ^b	35
116-F-4	20 ^a	37
116-F-6	20 ^a	36
116-F-9C	20 ^c	50
116-F-14	24 ^c	30

^a from Dorian and Richards, 1978.

^b based on Hanford Site Waste Information Data System (WIDS).

^c based on trench depth from WIDS.

3.3.1 Borehole

Analytical sampling will be conducted using a split-spoon sampler per the 100-FR-1 Operable Unit work plan (DOE-RL 1992, Section 5.1.1.5.2) and EII 5.2, Soil and Sediment Sampling (WHC 1988c). Soil cuttings will be continuously screened along the entire soil column per the criteria stated in Section 3.1 from the surface to the final depth.

3.3.2 Test Pit

Analytical samples will be collected directly from the backhoe bucket using hand tools and standard soil sampling techniques per EII 5.2, Soil and Sediment Sampling (WHC 1988c). Excavated soil will be continuously screened

over the entire soil column per the criteria stated in Section 3.1.2 from the surface to the final depth (Table 2). The bucket will be cleaned of visible dirt at each excavation site between test pit locations. A bucket of soil will be removed from the desired sampling interval and brought to the side of the test pit for sampling. Samples will be collected from soil in the middle of the bucket, away from the bucket sides.

Table 2. Test Pit Expected Waste Depths.

Test pit	Expected waste depth (ft)	Depth to groundwater (ft)
116-F-1B	0 to 13	13
116-F-1C	0 to 13	13
116-F-3	20	37
116-F-9D	20	50

Sample depths will be estimated using measured dimensions of the backhoe bucket and arm. Measurements may be marked on the bucket using soapstone or other noncontaminating marker. If a more precise method of measuring sample depths is used, it will be identified in the field logbook.

All waste generated as a result of test pit investigation activities will be handled as a special case as stated in EII 4.3, Control of CERCLA and other Past-Practice Investigation Derived Waste (WHC 1988c). At the direction of the field team leader, plastic or other covering may be placed on the ground adjacent to the excavation for the temporary stock-piling of excavated material. After all samples have been collected at a particular location, the excavation will be backfilled and compacted in 5-ft lifts in approximately the reverse order, so that the first bucketful excavated is the last bucketful backfilled. Material will be compacted after replacement of each lift, to the extent possible, with the backhoe bucket.

The expected waste depths for the two test pits (116-F-1B and 116-F-1C) are from the surface to groundwater. Sampling will commence at the surface and continue every 5 ft to at least 13 ft. Continue sampling until screening results indicate clean as per Section 3.3. In both locations, the groundwater is estimated to be at a depth of about 13 ft (Dorian and Richards, 1978).

The 108-F crib will be sampled at the surface and again at 5 ft below ground surface with a hand auger.

3.4 SOIL SAMPLING (PHYSICAL PROPERTY)

Up to five samples for physical property analysis will be collected from the borehole at 116-F-14 Retention Basin (DOE-RL 1992, Section 5.1.1.5.2). Samples submitted for physical properties analysis must be below the detection

limits of the instruments for both radionuclides and VOC. To achieve this, it may be necessary to drill beyond the screening cutoff point.

At intervals where both physical property and analytical sample collections are called for, analytical sampling takes priority if an inadequate sample volume is available.

A split-spoon sampler will be used in lieu of a carbide-tipped core barrel per the work plan for the 100-FR-1 Operable Unit (DOE-RL 1992, Section 5.1.1.5.2).

The field geologist must use professional judgement to select samples that are representative of the principle soil types that can be sampled with the split-spoon sampler. The basic criteria for the sample location is that the sample shall be collected at or below the expected waste depth as defined in Section 3.3. Two 6-in. sleeves will provide adequate sample volume. The field geologist will record the selected samples in the borehole log per EII 9.1, Geologic Logging (WHC 1988c).

The physical property samples will be measured for the following parameters using American Society for Testing and Materials (ASTM) methods (DOE-RL 1992, Section 5.1.1.5.4 and Attachment 1). Unsaturated hydraulic conductivity will be calculated, and the sample will be archived.

- Bulk density
- Particle size distribution (ASTM D422-63)
- Moisture content (ASTM D2216)
- Moisture retention (ASTM D2325-68, D3152-72)
- Saturated hydraulic conductivity (ASTM D2434-68)
- Unsaturated hydraulic conductivity at 10% moisture content after full saturation.

3.5 GEOPHYSICAL LOGGING

All boreholes will be logged using either a gross gamma or spectral gamma logging tool per the 100-FR-1 Operable Unit work plan (DOE-RL 1992, Section 5.1.1.5.2) and EII 11.1, Geophysical Logging (WHC 1988c). Spectral gamma logging is preferred. If the spectral gamma logging tool is not available, the gross gamma logging tool will be used. The field team leader will annotate the reason for not using the spectral gamma logging tool in the field logbook (EII 1.5). No geophysical logging will be performed in the test pits.

4.0 ANALYSES

Samples collected for chemical analysis will be analyzed for the full suite of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 Contract Laboratory Program (CLP) target compound list (TCL) (EPA 1988) and target analyte list (TAL) (EPA 1989) constituents and certain specified ions and radionuclides. Estimated quantity of material needed for analyses are shown in Table 3. The laboratory will use existing Level IV CLP methods and methods approved under their contract for radiological analyses (Level V, Level III for anions). Sample custody will follow the procedures as specified in 100-FR-1 Operable Unit work plan (DOE-RL 1992, Appendix A, Section 5.0) and EII 5.1, Chain of Custody (WHC 1988c).

If full sample volume requirements cannot be met, the field team leader or the sampling scientist will record the volume obtained and the reason(s) why the full sample volume requirements cannot be met in the logbook per EII 1.5, Field Logbooks (WHC 1988c) and the field samplers collect samples in the following order:

1. Radioisotopes.
2. Semivolatiles/polychlorinated biphenyl/pesticides/anions.
3. Target analyte list.
4. Total activity.
5. Volatiles.

5.0 QA/QC REQUIREMENTS

Internal QC samples shall be collected as specified in Appendix A, Quality Assurance Project Plan (DOE-RL 1992) with the revisions as outlined below. The sampling shall be documented in the sampling logbook per EII 1.5, Field Logbooks (WHC 1988c).

1. Collect one duplicate per sampling session (six boreholes or four test pits) or every 20 samples, whichever is greater.
2. Collect split samples at the same frequency as duplicates.
3. Field blanks are not required.
4. Collect one sample each month from any source of water introduced into the hole during drilling. Only one sample is required for both groundwater and vadose borings. Analyze for the full suite of water parameters. (See Stankovich [1992] for parameters and volume requirements.)
5. Collect one trip blank for each batch of containers shipped to the sampling (site) facility and analyze for volatile organics only. The media shall be silica sand.

Table 3. List of Analytes.

Analyte	Method	Holding time	Container/volume
<u>Generic</u>			
ICP/AA metals	200.7 CLP-M ^a	6 mo	Glass, 250 mL
Mercury	245.1 CLP-M	28 d	
Cyanide	335.2 CLP-M	14 d	
Volatile organic	CLP ^b	14 d	Glass, 125 mL
Semivolatile organic	CLP ^b	7 d ^c	Amber glass, 1,000 mL
PCB/pesticides	CLP ^b	7 d ^c	
Anions/IC: fluorides sulfates nitrates, nitrites	EPA 300 ^d EPA 300 ^d EPA 353.2	28 d	
<u>TMA</u>			
Gross alpha	EA-82	6 mo	Glass/plastic, 1,000 mL
Gross beta	EA-82		
Gamma spec	RC-30		
Alpha spec			
Americium-241	EP-80, EP-90, EP-92, EP-93, EP-5		
Plutonium-239/240	EP-80, EP-81, EP-5		
Uranium-235/238	EP-70, EP-71, EP-5		
Carbon-14	EA-85, EA-85A		
Strontium-90	RC-306, RC-303, RC-309, RC-304		
<u>Weston</u>			
Gross alpha	PRO-032-302	6 mo	Glass/plastic, 1,000 mL
Gross beta	PRO-032-302		
Gamma spec	PRO-042-5		
Alpha spec			
Americium-241	PRO-062-109		
Plutonium-239/240	PRO-052-32		
Uranium-235/238	PRO-052-32		
Carbon-14	PRO-032-80		
Strontium-90	PRO-032-38, PRO-032-25		
<u>222-S Laboratory</u>			
Total activity	Prep: LA-548-111 Procedure: LA-508-121	6 mo	Plastic or glass small vial (at least 1 g)

AA = atomic absorption

IC = ion chromatography

ICP = inductively coupled plasma

SOP = standard operating procedure.

NOTE: There are no chemical preservation requirements.

^aModified for the CLP.^bCLP methods, target detection limits, and minimum values for precision and accuracy shall be as specified in the statement of work for CLP services (EPA 1988, 1989).^c7 d to extraction; 40 d after.^dModified (Lindahl 1984).

6. Collect equipment blanks at the same frequency as duplicates and analyze for constituents listed in Table 3. The media shall be silica sand.

7. Collect two background samples from the background site shown in Figure 5, and analyze for the constituents listed in Table 1. This requirement is for borehole samples only.

6.0 SCHEDULE

The following schedule is for drilling and sampling in the 100-FR-1 Operable Unit for 1993. This schedule is subject to change and the DOE-RL operable unit manager should be contacted for current status. An Agreement Activity Notification form will be issued at least 5 days prior to the start of field work.

<u>Borehole location</u>	<u>Drilling dates</u>
116-F-6	Late Jan. to mid Feb. 1993
116-F-2	Late Jan. to mid Feb. 1993
116-F-1A	Mid to late Feb. 1993
116-F-9C	Mid to late Feb. 1993
116-F-14	Early to mid March 1993
116-F-4	Early to mid March 1993

<u>Test pit location</u>	<u>Excavation Date</u>
116-F-1B	Late March 1993
116-F-1C	Late March 1993
116-F-3	Early April 1993
116-F-9D	Early April 1993
108-F (hand sample only)	As convenient

7.0 CHANGES TO DESCRIPTION OF WORK

Unforeseeable major changes to this DOW, such as analyzing different parameters, using different analytical methods, or changing the sampling interval will be submitted using the Engineering Change Notice form (foreseeable changes will be submitted to the lead regulatory agency for approval or review prior to deviating from the DOW). Copies will be submitted to the lead regulatory agency and appropriate field personnel within 10 working days of the change.

8.0 REFERENCES

DOE-RL, 1991, *Hanford Site Waste Information Data System*, data file accessed June 16, 1991, U.S. Department of Energy, Richland Field Office, Richland, Washington.

- DOE-RL, 1992, *Remedial Investigation/Feasibility Study Work Plan for the 100-FR-1 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL-90-33, Rev. 0, U.S. Department of Energy, Richland Field Office, Richland, Washington.
- Dorian, J. J. and V. R. Richards, 1978, *Radiological Characterization of the Retired 100 Areas*, UNI-946, United Nuclear Industries, Richland, Washington.
- EPA, 1987, *Data Quality Objectives for Remedial Response Activities*, EPA/540/G-87 003, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988, *USEPA Contract Laboratory Program Statement of Work for Organic Analysis*, Sample Management Office, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1989, *USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis*, Sample Management Office, U.S. Environmental Protection Agency, Washington, D.C.
- Lindahl, P. C., 1984, *Determination of Inorganic Ions in Aqueous and Solid Samples of Ion Chromatography*, EPA/600/4-84, Argonne National Laboratory, Argonne, Illinois.
- Stankovich, 1992, *Description of Work for the 100-BG-5 Groundwater Operable Unit*, WHC-SD-EN-AP-070, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Taylor, 1991, *100 Area Low Hazard Characterization Activities Safety Assessment*, WHC-SD-EN-SAD-002, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1987, *Industrial Safety Manual*, WHC-CM-4-3, 3 Vols., Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988a, *ALARA Program*, WHC-CM-4-11, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988b, *Environmental Compliance Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988c, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1988d, *Radiation Protection*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1990, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0383, Westinghouse Hanford Company, Richland, Washington.

Date Received:

4/14/93 JDS

INFORMATION RELEASE REQUEST

Reference:

WHC-CM-3-4

Complete for all Types of Release

<input type="checkbox"/> Speech or Presentation <input type="checkbox"/> Full Paper (Check only one suffix) <input type="checkbox"/> Summary <input type="checkbox"/> Abstract <input type="checkbox"/> Visual Aid <input type="checkbox"/> Speakers Bureau <input type="checkbox"/> Poster Session <input type="checkbox"/> Videotape		<input type="checkbox"/> Reference <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Thesis or Dissertation <input type="checkbox"/> Manual <input type="checkbox"/> Brochure/Flier <input type="checkbox"/> Software/Database <input type="checkbox"/> Controlled Document <input type="checkbox"/> Other	ID Number (include revision, volume, etc.) WHC-SD-EN-AP-091, Rev. 2 List attachments. Date Release Required 4/16/93
---	--	---	---

 Title Description of Work for Vadose Drilling in the
 100-FR-1 Operable Unit

 Unclassified Category
 UC-NA

 Impact
 Level 3Q

 New or novel (patentable) subject matter? ☒ No ☐ Yes
 If "Yes", has disclosure been submitted by WHC or other company?

☐ No ☐ Yes Disclosure No(s).

 Information received from others in confidence, such as proprietary data,
 trade secrets, and/or inventions?

☒ No ☐ Yes (Identify)

 Copyrights? ☒ No ☐ Yes
 If "Yes", has written permission been granted?

☐ No ☐ Yes (Attach Permission)

Trademarks?

☒ No ☐ Yes (Identify)

Complete for Speech or Presentation

 Title of Conference or Meeting
 NA

 Group or Society Sponsoring
 NA

Date(s) of Conference or Meeting

NA

City/State

NA

Will proceedings be published?

☐ Yes☐ No

Will material be handed out?

☐ Yes☐ No

Title of Journal

NA

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4

Yes

No

Reviewer - Signature Indicates Approval

Name (printed)

Signature

Date

Classification/Unclassified/Controlled
Nuclear Information☐☒

Patent - General Counsel

☒☐

Legal - General Counsel

☒☐Applied Technology/Export Controlled
Information or International Program☐☒

WHC Program/Project

☐☒

Communications

☐☒

RL Program/Project

☐☒

Publication Services

☒☐

Other Program/Project

☐☒

Information conforms to all applicable requirements.

The above information is certified to be correct.

 References Available to Intended Audience
☒ Yes ☐ No

 Transmit to DOE-HQ/Office Scientific
 and Technical Information
☐☒

Author/Requestor (Printed/Signature)

Date

J.M. Ayres

4/14/93

Intended Audience

☐ Internal ☐ Sponsor ☒ External

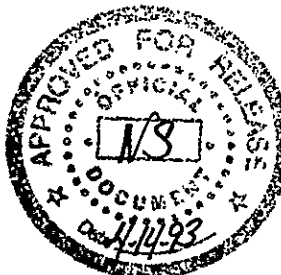
Responsible Manager (Printed/Signature)

Date

R.P. Henckel

4-14-93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

 Stamp is required before release. Release is contingent upon resolution of
 mandatory comments.


Date Cancelled

Date Disapproved